

CLAIMS

What is claimed is:

1. A light emitting device assembly comprising:
at least one encapsulation layer encasing
 - (a) a light emitting diode (LED) chip,
 - (b) a substrate having two terminals, a first one of said two terminals having a portion with a width at least as wide as said LED chip and a vertical cross-sectional area of at least 30% of the total vertical cross-sectional area of said encased assembly, and
 - (c) an adhesive that connects said LED chip to said first terminal of said substrate.
2. The light emitting device assembly of claim 1 wherein said adhesive is thermally conductive.
3. The light emitting device assembly of claim 1 wherein said adhesive is metal-based.
4. The light emitting device assembly of claim 1 wherein said portion of said first terminal is enlarged so as to protrude from said at least one encapsulation layer.
5. The light emitting device assembly of claim 4 wherein said portion of said first terminal is placed in contact with another metal surface so as to further increase thermal conductivity.
6. The light emitting device assembly of claim 1 wherein said portion of said first terminal is enlarged so as to be at least flush with an edge of said at least one encapsulation layer.
7. The light emitting device assembly of claim 1 wherein said portion of said first terminal has increased thickness to increase thermal capacity of said assembly and to sink more heat from said LED chip.

8. The light emitting device assembly of claim 1 wherein said at least one encapsulation layer is comprised of:

a first layer encapsulant with enhanced thermal conducting properties wherein said first layer encapsulant substantially encases said portion of said first terminal; and

a second layer encapsulant which is attached to said first layer encapsulant on one side to encapsulate the remainder of said assembly.

9. The light emitting device assembly of claim 8 wherein said second layer encapsulant is optically clear.

10. The light emitting device assembly of claim 8 wherein said first layer encapsulant is selected from the group consisting of:

transparent material;

semi-transparent material;

opaque material; and

polymer-based material.

11. The light emitting device assembly of claim 8 wherein said first layer encapsulant is comprised of fillers to enhance thermal conductivity.

12. The light emitting device assembly of claim 11 wherein said fillers are ceramic, glass or aluminum particles.

13. The light emitting device assembly of claim 1 wherein said adhesive is selected from a group comprised of at least:

a solder alloy;

a tin-based or gold-based alloy; and

indium.

14. The light emitting device assembly of claim 1 wherein said vertical cross-sectional area of said portion of said first terminal is at least 0.014 in².

15. The light emitting device assembly of claim 14 wherein said at least one encapsulant layer encapsulates a 5 mm through-hole lamp.

16. A system comprising:
at least one encapsulation layer encasing an assembly, wherein said assembly includes
(a) at least one light emitting diode (LED) chip;
(b) a first terminal, said first terminal entering said encapsulation layer through an edge and wherein said first terminal has a portion with a width at least as wide as said LED chip wherein said portion of said first terminal extends so as to be at least flush with said edge of said at least one encapsulation layer;
(c) at least one second terminal, wherein the number of said at least one second terminal corresponds to the number of said at least one LED chip; and
(d) at least one adhesive connecting said at least one LED chip to said first terminal.

17. The system of claim 16 wherein said at least one encapsulation layer is comprised of:

a first layer encapsulant with enhanced thermal conducting properties wherein said first layer encapsulant substantially encases said portion of said first terminal; and

a second layer encapsulant which is attached to said first layer encapsulant on one side to encapsulate the remainder of said assembly.

18. The system of claim 16 wherein said assembly has a thermal resistance of at most 150°C/W.

19. A method for enhancing light emitting diode (LED) heat dissipation properties of a light emitting device assembly, said method comprising:

positioning a LED chip within a cavity of a first terminal, said first terminal having a portion with a width that is at least as wide as said LED chip and a vertical cross-sectional area of at least 30% of the total vertical cross-sectional area of said assembly;

attaching said LED chip to said first terminal with adhesive;

connecting said LED chip to a second terminal;

inserting a portion of said terminals connected to said LED chip into a shell;

pouring a second layer encapsulant into said shell; and

pouring a first layer encapsulant into said shell, wherein said first and second layer encapsulants solidify, taking the shape of said shell.

20. The method of claim 19 further comprising:
incorporating fillers into said first layer encapsulant to enhance thermal conductivity.